

02-03-04  
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Richard P. RUSIN et al.

Group Art Unit: 3732

Serial No.: 09/383,560

Examiner: Ralph A. Lewis

Confirmation No.: 6747

Filed: 26 August 1999

Docket No.: 54989US002

Title: CERAMIC DENTAL MILL BLANKS

Commissioner for Patents

Mail Stop Appeal Brief - Patents

P.O. Box 1450

Alexandria, VA 22313-1450

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- ☒ An itemized return postcard.  
☐ A Petition for Extension of Time for \_\_\_ month(s) and a check in the amount of \$\_\_\_ for the required fee.  
☐ An Information Disclosure Statement (\_\_\_ pgs); copies of \_\_\_ applications; 1449 forms (\_\_\_ pgs); and copies of \_\_\_ documents cited on the 1449 forms.  
☒ Please charge Deposit Account No. 13-4895 in the amount of \$330.00, for Appeal Brief fee.  
☐ A certified copy of a \_\_\_ application, Serial No. \_\_, filed \_\_\_\_, the right of priority of which is claimed under 35 U.S.C. §119.  
☒ Other: Appellants' Brief on Appeal (9 pgs); Appendix A (4 pgs); Appendix B (103 pgs); and Appendix C (79 pgs) (all in triplicate).  
Amendment \_\_\_ No Additional fee is required. \_\_\_ The fee has been calculated as shown:

Fee Calculation for Claims Pending After Amendment					
	Pending Claims after Amendment (1)	Claims Paid for Earlier (2)	Number of Additional Claims (1-2)	Cost per Additional Claim	Additional Fees Required
Total Claims				x \$18 =	
Independent Claims				x \$86 =	
One or More New Multiple Dependent Claims Presented? If Yes, Add \$290 Here →					
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Please consider this a PETITION FOR EXTENSION OF TIME for a sufficient number of months to enter these papers and please charge any additional fees or credit overpayment to Deposit Account No. 13-4895. Triplicate copies of this sheet are enclosed.

MUETING, RAASCH & GEBHARDT, P.A.

By:   
Name: Loren D. Albin  
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T.W.  
2-17-04

PATENT  
Docket No. 54989US002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant(s): Richard P. RUSIN et al. ) Group Art Unit: 3732  
Serial No.: 09/383,560 ) Examiner: Ralph A. Lewis  
Confirmation No.: 6747 )  
Filed: August 26, 1999 )  
For: CERAMIC DENTAL MILL BLANKS )

**APPELLANTS' BRIEF ON APPEAL**

Commissioner for Patents  
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P.O. Box 1450  
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Dear Sir:

This Brief is presented in support of the Appeal filed December 2, 2003 from the final rejection of claims 55-79 of the above-identified application under 37 C.F.R. §§1.113 and 1.191 as set forth in the Final Office Action mailed September 10, 2003.

This Brief is being submitted in triplicate, as set forth in 37 C.F.R. §1.192(a). Appellants hereby authorize a charge to Deposit Account No. 13-4895 in an amount sufficient to cover the fee for filing this Brief under 37 C.F.R. §1.17(c).

**Real Party in Interest**

The real party in interest is 3M Innovative Properties Company of St. Paul, Minnesota, as evidenced by the assignment recorded at Reel 010387, Frame 0740.

**Related Appeals and Interferences**

There are no appeals or interferences known to Appellants' Representatives that will directly affect, be directly affected by, or have a bearing on the Board's decision in the pending appeal.

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**Status of Claims**

Claims 1-54 having been canceled, the pending claims are claims 55-79. Rejected claims 55-79, all of which are on appeal, are listed in APPENDIX A.

**Status of Amendments**

No amendments have been filed subsequent to the Final Office Action mailed September 10, 2003.

Appellants thank the Examiner for granting a telephonic interview with Appellants' Representative, Loren D. Albin, on November 19, 2003. Appellants' Representative presented reasons similar to those of record for the patentability of claims 55-79 over the cited art. However, no agreement was reached.

**Information Disclosure Statement**

The Examiner indicated that there is no record in the file wrapper of the United States Patent and Trademark Office of an Information Disclosure Statement submitted by Appellants on December 4, 2000. Appellants are hereby submitting copies of the Information Disclosure Statement submitted by Appellants on December 4, 2000, the 1449 form, the three documents listed on the 1449 form, and the return-addressed postcard stamped to indicate receipt by the United States Patent and Trademark Office (APPENDIX C). Consideration of each of the documents listed on the 1449 form(s) is respectfully requested. Pursuant to the provisions of M.P.E.P. §609, Appellants further request that a copy of the 1449 form(s), marked as being considered and initialed by the Examiner, be returned with the next Official Communication.

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**Summary of the Invention**

The present invention provides a method of making a dental prosthesis for repairing or restoring dentition.

In one embodiment, the method includes the steps: (a) providing a crystalline ceramic mill blank in which the crystalline ceramic has a density greater than about 98% of the theoretical density of the crystalline ceramic; (b) milling the crystalline ceramic mill blank provided in step (a) into the shape of the dental prosthesis; and (c) optionally, finishing an outer surface of the dental prosthesis to customize the fit of the dental prosthesis for repairing or restoring the dentition (e.g., independent claim 55).

In another embodiment, the method includes the steps: (a) providing a crystalline ceramic mill blank wherein the ceramic is crystalline aluminum oxide that has less than 5 wt. % glass, is essentially free of oxy-nitride, and has a density greater than about 99.5% of the theoretical density of the crystalline aluminum oxide; (b) using a computer controlled milling machine to mill the crystalline ceramic mill blank from step (a) into the shape of the dental prosthesis; (c) applying an aesthetic composite or aesthetic porcelain layer to the milled product from step (b); and (d) optionally, finishing an outer surface of the dental prosthesis to customize the fit of the dental prosthesis for repairing or restoring the dentition (e.g., independent claim 76).

Notably, in both of the above embodiments, the crystalline ceramic mill blank is not sintered subsequent to step (a) (e.g., claims 55-79).

**Issue**

I. Whether claims 55-79 are unpatentable under 35 U.S.C. §103(a) as obvious over U.S. Pat. No. 5,217,275 (Oden et al.) in view of PCT Application International Publication No. WO 98/36871 (Rostvall).

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**Grouping of Claims**

For the purposes of this appeal, claims 55-79 stand or fall together with respect to the Issue identified herein above.

**Arguments**

Claims 55-79 were rejected under 35 U.S.C. §103(a) as being obvious over U.S. Pat. No. 5,217,275 (Oden et al.) in view of PCT Application International Publication No. WO 98/36871 (Rostvall). Appellants respectfully traverse the rejection, and request review and reversal by the Board.

***A. NEITHER ODEN ET AL. NOR ROSTVALL TEACH OR SUGGEST ALL THE CLAIM LANGUAGE***

“To establish a *prima facie* case of obviousness . . . the prior art reference (or references when combined) must teach or suggest all the claim limitations.” M.P.E.P. §706.02(j), citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Oden et al. disclose “a prefabricated core designed for preparations for onlay tooth crowns or inlays in natural teeth. The core is preferably fabricated from a high strength densely sintered ceramic material by copy milling” (Abstract). Oden et al. contemplate that sintering after copy milling is required, by disclosing that “[d]uring this copy milling, the sintering shrinkage *must be considered*” (column 4, lines 65-67, emphasis added). Thus, even though Oden et al. disclose that “[t]he ceramic body can also be presintered before copy milling” (column 5, lines 5-6), a “final sintering” (i.e., after copy milling) (column 5, line 8) is still recited. Moreover, as admitted by the Examiner, “one of ordinary skill in the art would have readily recognized and appreciated that the machining is done prior to full sintering because after final sintering the blank is generally too hard to be machined effectively” (page 3 of Office Action mailed September 10, 2003).

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Rostvall discloses “a procedure and device for the abrasive precision machining of a blank made of a material with a high degree of hardness” (page 1, lines 2-3). Rostvall discloses that “[t]he blanks can be made of ceramic powder or granule material, plastics, composites, etc.” (page 2, line 23 to page 3, line 1). However, Rostvall is totally silent regarding if or when the blank is sintered.

However, neither Oden et al. nor Rostvall, either alone or in combination, teach or suggest that the crystalline ceramic mill blank is not sintered subsequent to step (a) (e.g., claims 55-79).

**B. ODEN ET AL. AND ROSTVALL FAIL TO PROVIDE MOTIVATION FOR ONE OF SKILL IN THE ART TO MODIFY THEIR TEACHINGS TO ARRIVE AT THE PRESENTLY CLAIMED INVENTION**

“To establish a *prima facie* case of obviousness . . . there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. . . . The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure.” M.P.E.P. §706.02(j), citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Oden et al., as discussed herein above, teaches a final sintering after copy milling. Rostvall, as discussed herein above, is totally silent regarding if or when the blank is sintered. Thus, the cited documents themselves clearly fail to provide motivation for one of skill in the art to modify Oden et al. in view of Rostvall to exclude sintering of a ceramic mill blank subsequent to copy milling.

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*C. THE EXAMINER HAS FAILED TO PRESENT A CONVINCING LINE OF REASONING AS TO WHY THE PRESENT CLAIMS ARE OBVIOUS IN LIGHT OF THE TEACHINGS OF THE CITED DOCUMENTS*

“The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. ‘To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.’” M.P.E.P. §706.02(j), quoting *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). “The level of skill in the art cannot be relied upon to provide the suggestion to combine references.” M.P.E.P. §2143.01, citing *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999).

In the Office Action mailed March 20, 2003, the Examiner asserted that “[t]o have fully sintered the Oden blanks prior to machining in order to eliminate the shrinkage problem and to have machined the high degree of hardness blanks in the manner taught by Rostvall would have been obvious to one of ordinary skill in the art” (sentence spanning pages 2-3). Appellants responded by submitting that the motivation alleged by the Examiner is based on an improper “obvious to try” argument. *See, for example*, M.P.E.P. §2143.01, citing *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990) (“The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.”).

In rebuttal, the Examiner asserted that “[t]he ordinarily skilled artisan would readily recognize that there are three options to shaping any ceramic body (1) shaped before sintering, (2) shaped after sintering (applicant) or (3) shaped somewhere in the middle of the sintering process (Oden et al.). The ordinarily skilled artisan would readily recognize that there are advantages and disadvantages to each, if the ceramic body is shaped while it is soft prior to sintering, then the shaped body will shrink. On the other hand, if the ceramic body is shaped

after sintering, it will not shrink, but it is hard and difficult to shape” (paragraph spanning pages 2-3 of the Final Office Action mailed September 10, 2003). Further, in discussing Oden et al., the Examiner asserted that “one of ordinary skill in the art would have readily recognized and appreciated that the machining is done prior to full sintering because after final sintering the blank is generally too hard to be machined effectively” (page 3, first full paragraph of the Final Office Action mailed September 10, 2003).

Appellants note that the cited documents fail to explicitly support these assertions. Further, even if the assertions arguably were true, Rostvall fails to provide motivation for one of skill in the art to modify Oden et al. to arrive at the presently claimed invention. Rostvall et al., which is totally silent regarding if or when the blank is sintered, and totally silent regarding shrinkage, provides no guidance to one of skill in the art in selecting one of the three postulated options to shape a ceramic body (i.e., shaped before sintering, shaped after sintering, or shaped somewhere in the middle of the sintering process) as asserted by the Examiner. Thus, Appellants respectfully submit that the Examiner is impermissibly relying on the level of one of skill in the art for the suggestion to modify the cited documents to arrive at the presently claimed invention.

**D. ROSTVALL ET AL. TEACHES AWAY FROM THE PRESENTLY CLAIMED INVENTION**

“A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention.” M.P.E.P. §2141.02, citing *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). Appellants respectfully submit that Rostvall, when *considered in its entirety*, teaches away from the presently claimed invention.

Oden et al. disclose fabrication of a core from “a high strength densely sintered ceramic material by copy milling,” followed by a “final sintering” (Abstract and column 5, line 8). Arguably, if one of skill in the art had motivation to modify Oden et al. to exclude sintering of a ceramic mill blank subsequent to copy milling, copy milling of a fully sintered ceramic mill



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blank would be required, which in effect, would *increase the* difficulty of the copy milling process.

In contrast, Rostvall is directed to *decreasing the difficulty* of the copy milling process. Specifically, Rostvall recognizes that “[t]he problem of machining new materials with a high degree of hardness and/or toughness has limited the use of such materials. For example, ceramic powders or granules, lightweight metals, plastics and composites are often difficult to machine using conventional techniques” (page 1, lines 7-9). As a solution to the problem, Rostvall discloses “high speed machining” procedures and devices “effective . . . to work ceramics” (e.g., page 2, lines 8-10). In short, Rostvall is directed towards *decreasing the difficulty* of machining materials (e.g., ceramic powders or granules). Thus, Appellants respectfully submit that Rostvall et al. teach away from modifying the teachings of Oden et al. to arrive at the presently claimed invention.

**Appellants' Brief on Appeal**

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**Conclusion**

For at least the reasons presented herein above, Appellants respectfully submit that the Examiner has failed to present a *prima facie* case of unpatentability of claims 55-79. Review and reversal of the rejection of claims 55-79 are respectfully requested.

Respectfully submitted for

Richard P. RUSIN et al.

By

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By: 

Name: Rachel Engliardi-Grabner



**APPENDIX A – PENDING CLAIMS ON APPEAL**  
**Serial No.: 09/383,560**  
**Docket No.: 54989US002**

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55. A method of making a dental prosthesis for repairing or restoring dentition, the method comprising the steps:

- (a) providing a crystalline ceramic mill blank in which the crystalline ceramic has a density greater than about 98% of the theoretical density of the crystalline ceramic;
- (b) milling the crystalline ceramic mill blank provided in step (a) into the shape of the dental prosthesis; and
- (c) optionally, finishing an outer surface of the dental prosthesis to customize the fit of the dental prosthesis for repairing or restoring the dentition;

wherein the crystalline ceramic mill blank is not sintered subsequent to step (a).

56. A method according to claim 55 further comprising a step of applying an aesthetic composite or aesthetic porcelain layer to the dental prosthesis.

57. A method according to claim 55 wherein the crystalline ceramic mill blank has a density greater than about 99% of the theoretical density of the crystalline ceramic.

58. A method according to claim 57 wherein the crystalline ceramic mill blank has a density greater than about 99.5% of the theoretical density of the crystalline ceramic.

59. A method according to claim 55 wherein the crystalline ceramic mill blank comprises less than about 5 wt% glass.

60. A method according to claim 59 wherein the crystalline ceramic mill blank comprises less than about 2 wt% glass.

**APPENDIX A – PENDING CLAIMS**

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61. A method according to claim 55 wherein the crystalline ceramic mill blank is essentially free of oxy-nitride.
62. A method according to claim 55 wherein the crystalline ceramic mill blank has a Contrast Ratio value less than about 0.7.
63. A method according to claim 62 wherein the crystalline ceramic mill blank has a Contrast Ratio value less than about 0.6.
64. A method according to claim 63 wherein the crystalline ceramic mill blank has a Contrast Ratio value less than about 0.5.
65. A method according to claim 55 wherein the crystalline ceramic mill blank is milled into the shape of the dental prosthesis using a computer controlled milling machine.
66. A method according to claim 65 wherein the crystalline ceramic mill blank is flushed with a liquid lubricant during milling.
67. A method according to claim 65 wherein the crystalline ceramic mill blank is flushed with a stream of air or gas during milling.
68. A method according to claim 65 wherein the crystalline ceramic mill blank is milled into the shape of the dental prosthesis in less than about 3 hours.
69. A method according to claim 68 wherein the crystalline ceramic mill blank is milled into the shape of the dental prosthesis in less than about 2 hours.

**APPENDIX A – PENDING CLAIMS**

**Page A-3**

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70. A method according to claim 69 wherein the crystalline ceramic mill blank is milled into the shape of the dental prosthesis in less than about 1 hour.

71. A method according to claim 55 wherein the crystalline ceramic mill blank, after milling, has a flexural strength greater than about 250 MPa.

72. A method according to claim 71 wherein the crystalline ceramic mill blank, after milling, has a flexural strength greater than about 350 MPa.

73. A method according to claim 72 wherein the crystalline ceramic mill blank, after milling, has a flexural strength greater than about 500 MPa.

74. A method according to claim 55 wherein the crystalline ceramic mill blank is nanocrystalline ceramic.

75. A method according to claim 55 wherein the crystalline ceramic mill blank is provided as cube, an elongate bar or a solid cylinder.

76. A method of making a dental prosthesis for repairing or restoring dentition, the method comprising the steps:

- (a) providing a crystalline ceramic mill blank wherein the ceramic is crystalline aluminum oxide that has less than 5 wt. % glass, is essentially free of oxy-nitride, and has a density greater than about 99.5% of the theoretical density of the crystalline aluminum oxide;
- (b) using a computer controlled milling machine to mill the crystalline

**APPENDIX A – PENDING CLAIMS**

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ceramic mill blank from step (a) into the shape of the dental prosthesis;

- (c) applying an aesthetic composite or aesthetic porcelain layer to the milled product from step (b); and
- (d) optionally, finishing an outer surface of the dental prosthesis to customize the fit of the dental prosthesis for repairing or restoring the dentition;

wherein the crystalline ceramic mill blank is not sintered subsequent to step (a).

77. A method according to claim 76 wherein the crystalline ceramic mill blank is milled into the shape of the dental prosthesis in less than about 1 hour.

78. A method according to claim 76 wherein the dental prosthesis for repairing or restoring dentition is an onlay, a veneer, a full crown, a partial crown, a bridge, an implant or a post.

79. A method according to claim 76 wherein the crystalline ceramic mill blank comprises a crystalline ceramic body attached to a stub for mounting the mill blank in the milling machine.

**APPENDIX B – CITED AUTHORITIES AND DOCUMENTS**

**Page B-1**


Serial No.: 09/383,560

Confirmation No.: 6747

Filed: 26 August 1999

For: CERAMIC DENTAL MILL BLANKS

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1. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999).
  2. *Ex parte Clapp*, 227 USPQ 972 (Bd. Pat. App. & Inter. 1985).
  3. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).
  4. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).
  5. M.P.E.P. §706.02(j), Eighth Edition, Revision 1 (February 2003).
  6. M.P.E.P. §2141.02 Eighth Edition, Revision 1 (February 2003).
  7. M.P.E.P. §2143.01 Eighth Edition, Revision 1 (February 2003).
  8. PCT Application International Publication No. WO 98/36871 (Rostvall).
  9. U.S. Pat. No. 5,217,275 (Oden et al.).
  10. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

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